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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,314	03/19/2004	Matthijs H. Kuiper	LUM-03-06-09 US	7327
32566 7590 11/23/2007 PATENT LAW GROUP LLP 2635 NORTH FIRST STREET SUITE 223 SAN JOSE, CA 95134			EXAMINER DICKEY, THOMAS L	
			ART UNIT 2826	PAPER NUMBER
			MAIL DATE 11/23/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/804,314

Applicant(s)

KEUPER ET AL.

Examiner

Thomas L. Dickey

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 6-21,23-35 and 71-78 is/are pending in the application.
- 4a) Of the above claim(s) 8-17,25-31,35,77 and 78 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23 and 24 is/are allowed.
- 6) ☒ Claim(s) 6,7,18-21,32,33 and 71-74 is/are rejected.
- 7) ☒ Claim(s) 34,75 and 76 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>09/27/2007</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. The amendment filed on 09/27/2007 has been entered.

Information Disclosure Statement

2. The Information Disclosure Statement filed on 09/27/2007 has been considered.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 18-21, 32, 33, and 71-74 are rejected under 35 U.S.C. 102(b) as being anticipated by WEINDORF ET AL. (2002/0140880).

With regard to claims 18-21, 32, and 33 Weindorf et al. discloses an apparatus comprising a light-emitting diode 126 (which will necessarily and thus inherently include an epitaxial structure comprising an active region sandwiched between an n-type region and a p-type region, the active region configured to emit light when forward biased, see figure 10a-b and column 11 lines 33-66 of Holton 4,084,130); a non-absorbing wire grid

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polarizer 106 coupled to the active region, the non-absorbing wire grid polarizer 106 transmitting light having a desired polarization orientation and reflecting light that does not have the desired polarization orientation; a polarized microdisplay 104 disposed in a path of light transmitted by the non-absorbing wire grid polarizer 106; and a phosphor wavelength converting material means for randomizing 130 coupled to the active region and the non-absorbing wire grid polarizer 106, the phosphor wavelength converting material means for randomizing 130 positioned to receive light emitted from the active region and reflected from the non-absorbing wire grid polarizer 106, the phosphor wavelength converting material means for randomizing 130 at least partially randomizes the polarization state of the light. Further, the active region of Weindorf et al.'s light-emitting diode 126 is shaped roughly like a rectangular prism, with three pairs of parallel surfaces, each pair perpendicular to the other two pairs. Weindorf et al.'s non-absorbing wire grid polarizer 106 is likewise shaped roughly like a rectangular prism, with three pairs of parallel surfaces, each pair perpendicular to the other two pairs. Each pair of parallel surfaces of the active region of Weindorf et al.'s light-emitting diode 126 is substantially parallel to a pair of parallel surfaces of Weindorf et al.'s non-absorbing wire grid polarizer 106. For this reason it must be said that Weindorf et al.'s non-absorbing wire grid polarizer 106 is substantially parallel to the active region of Weindorf et al.'s

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light-emitting diode 126. Note figures 1 and 2 and paragraphs 0027-0032 of Weindorf et al.

With regard to claims 71-74 Weindorf et al. discloses an apparatus comprising a light-emitting diode 126 that emits light (a necessary function of a light-emitting diode) from a light emitting surface (since light-emitting diode 126 is bounded by all sides by surfaces it is necessary for the emitted light to leave through one or more of them); a non-absorbing wire grid polarizer 106 coupled to the light-emitting diode 126, the non-absorbing wire grid polarizer 106 transmitting light having a desired polarization orientation and reflecting light that does not have the desired polarization orientation; a phosphor wavelength converting material randomizing element 130 coupled to the active region and the non-absorbing wire grid polarizer 106, the phosphor wavelength converting material randomizing element 130 positioned to receive light emitted from the light-emitting diode 126 and reflected from the non-absorbing wire grid polarizer 106, the phosphor wavelength converting material randomizing element 130 at least partially randomizes the polarization state of the light; and a polarized microdisplay 104 disposed in a path of light transmitted by the non-absorbing wire grid polarizer 106. Further, Weindorf et al.'s light-emitting diode 126 is shaped roughly like a rectangular prism, with three pairs of parallel surfaces, each pair perpendicular to the other two pairs, one or more of said surfaces being the light emitting surface. Weindorf et al.'s

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non-absorbing wire grid polarizer 106 is likewise shaped roughly like a rectangular prism, with three pairs of parallel surfaces, each pair perpendicular to the other two pairs. Each pair of parallel surfaces of the active region of Weindorf et al.'s light-emitting diode 126 is substantially parallel to a pair of parallel surfaces of Weindorf et al.'s non-absorbing wire grid polarizer 106. Because each surface of Weindorf et al.'s light-emitting diode 126 is substantially parallel to at least one surface of Weindorf et al.'s non-absorbing wire grid polarizer 106, no matter which of said surfaces is a light-emitting surface, that surface will be substantially parallel to a pair of parallel surfaces of Weindorf et al.'s non-absorbing wire grid polarizer 106. Note figures 1 and 2 and paragraphs 0027-0032 of Weindorf et al.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over RODDY ET AL. (2003/0214633) in view of RUDEEN (5,945,670). In the examiner's

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opinion, this/these claim(s) would have been obvious according to one of the rationales expressed in the *Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in KSR International Co. v. Teleflex Inc.*, as published at 72 Federal Register 57526 et seq.¹ (10/10/2007).

The Guidelines explain that an invention that would have been obvious to a person of ordinary skill at the time of the invention is not patentable. The Guidelines point out that, as reiterated by the Supreme Court in KSR, the framework for the objective analysis for determining obviousness under 35 U.S.C. 103 is stated in *Graham v. John Deere Co.* Obviousness is a question of law based on underlying factual inquiries. The factual inquiries enunciated by the Court are as follows:

- (1) Determining the scope and content of the prior art;
- (2) Ascertaining the differences between the claimed invention and the prior art, and
- (3) Resolving the level of ordinary skill in the pertinent art.

Examining this last factor first, it is noted that any obviousness rejection should include, either explicitly or implicitly in view of the prior art applied, an indication of the level of ordinary skill. This is an essential finding because (as the Guidelines point out) a finding as to the level of ordinary skill may be used as a partial basis for a resolution of

¹ The Guidelines have been reproduced at various Web-accessible locations, notably http://www.aipla.org/Content/ContentGroups/About_AIPLA1/AIPLA_Reports/20074/72-57526.pdf

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the issue of obviousness. The person of ordinary skill in the art is a hypothetical person who is presumed to have known the relevant art at the time of the invention. Factors that may be considered in determining the level of ordinary skill in the art include:

- (1) "Type of problems encountered in the art;"
- (2) "prior art solutions to those problems;"
- (3) "rapidity with which innovations are made;"
- (4) "sophistication of the technology;" and
- (5) "educational level of active workers in the field."

In a given case, every factor may not be present, and one or more factors may predominate.

In the present case, Applicant has presented claims to a device classified in Class 257 (Semiconductor Devices). The types of problems encountered in Class 257 typically are highly complex, involving questions of electrodynamics, thermodynamics, crystallography, and quantum mechanics. Prior art solutions to the problems presented in this field demonstrate thinking of the highest order. Many prior art solutions in this field have won Nobel prizes. Past Nobel prizewinners for Class 257 innovations include John Bardeen, William Shockley, Jack Kilby, Leo Esaki, Nick Basow, Zhores Alferov, Pierre-Gilles de Gennes, and probably a half dozen more this writer has forgotten. Innovations in Class 257 are made with extremely high rapidity (see, e.g. "Moore's Law"). Technology used to make and practice inventions in this field are highly

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sophisticated. Some “fabs” (as those of skill in the art call the factories for making these devices) now cost in excess of one billion dollars each, and perform literally hundreds of billions of operations per hour. Finally, the educational level of active workers in this field is extremely high – Ph.D.s are common, and a bachelor’s degree in engineering is the absolute minimum educational level of workers in this field.

In short, the level of ordinary skill in this field is extremely high. In *KSR*, the Supreme Court cautioned, “A person of ordinary skill is also a person of ordinary creativity.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1742, 82 USPQ2d 1385, 1397 (2007). Had the Court taken a look at the high levels of education, ingenuity, and practical problem-solving ability of those who have practiced the semiconductor art in the past (as well as the incredible spectrum of difficult problems those of skill in the art have solved, with highly valuable results), the Examiner is convinced the Court would have said that the person of ordinary skill in the semiconductor arts is a person of extraordinary creativity.

Next, we consider the first and second factual findings required by *Graham*. The scope and content of the prior art includes, in the Roddy et al. disclosure, a description of a system comprising first and second “light sources” 12bg and 12g, each configured to emit light; a polarizing beamsplitter 87 (Roddy et al. use a dichroic mirror as the polarizing beamsplitter combining light from the “light sources” 12bg and 12g. Roddy et al. further discloses, paragraph 0073, that other devices such as “McNeille prisms, wire-

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grid polarization beamsplitters, or other suitable devices" may be used as beamsplitters) disposed in the path of the light emitted by the first "light source" 12bg and the light emitted by the second "light source" 12g, wherein the polarizing beamsplitter 87 combines light from the two light-emitting elements 12bg and 12g; and wherein a microdisplay 20g-20bg disposed in a path of light emitted by the first "light source" 12bg and the second "light source" 12g receives the light after being combined by the polarizing beamsplitter 87. Note figure 5 and paragraphs 0064-0073 of Roddy et al. The difference between the prior art system disclosed by Roddy et al. and the claimed device is that, where the claim requires the first and second "light sources" to be a 50% polarized light emitting diodes having epitaxial structures comprising active regions sandwiched between n-type and p-type regions (noting, as explained below, that all functioning light emitting diodes and laser diodes necessarily include epitaxial structures comprising active regions sandwiched between n-type and p-type regions), Roddy et al.'s system includes an "s-polarized" (note paragraph 0068) light source 12bg and a "p-polarized" (note paragraph 0069) light source 12g (producing, note paragraph 0069, "orthogonally polarized green and blue-green beams"), where the "preferred" form of light sources 12bg and 12g are "gas lasers, dye lasers, and diode pumped solid state lasers" (paragraph 0072) and acceptable light sources are LED's (ibid.).

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Rudeen discloses a system where a laser diode producing 99% polarized light (note column 5 lines 47-49) is put forward as a viable alternative (note column 4 lines 21-24) to "light source[s] such as a laser [or] a non-coherent light source such as a light emitting diode, or combinations thereof" Note column 4 lines 21-24 and column 5 lines 47-49 of Rudeen. Note that Holton 4,084,130 teaches us that since 1978 those familiar with the semiconductor art have considered it necessary, to produce light, for a laser diode such as the laser diode disclosed by Rudeen to include an epitaxial structure, such as (for an early example of the science proving this proposition) Holton's "GaAs EPITAXY," comprising an active region (such as Holton's active region 54) sandwiched between an n-type region (such as Holton's n-type region 57) and a p-type region (such as Holton's p-type region 55). Holton explains that this configuration is necessary so that electrons entering the active region from the n-type region (where electrons are plentiful) may "fall" into holes entering the active region from the p-type region, thereby emitting photons. Note figure 10a-b and column 11 lines 33-66 of Holton. Therefore the claimed "active region sandwiched between an n-type region and a p-type region, the active region configured to emit light when forward biased," are inherent to the laser diodes disclosed by Rudeen. See MPEP § 2112. Note further Applicants' recent contribution: Nishiyama et al., "Single-Transverse mode and Stable-Polarization Operation Under High-Speed Modulation of InGaAs-GaAs Vertical-Cavity Surface-

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Emitting Laser Grown on GaAs (311) B Substrate", IEEE Photonics Technology Letters 10(12), 1676-1678 (December 1998) (brought forward by Applicants on 9/27/07) shows, in figure 1, the necessary epitaxial structure, this time in the context of a laser diode. Nishiyama et al.'s figure 3 shows a 20-30 db difference between the first (-2,3,3) and second (1,1,-1) orthogonal excited polarizations of said laser diode. In view of Applicants' pre-knowledge that state-of-the art, off-the-shelf laser diodes produced 20-30 db separation between polarization modes at the time of the invention, it seems highly conservative of Applicants to require only that the first polarization have about 3 (note that 3 minus 1 divided by 3 plus 1 is the requisite "50% polarization") times (i.e. about 5 db) the intensity of the second. The question is, taking into account the high level of education, skill, and creativity of one of ordinary skill in the semiconductor art, would it have been obvious to substitute the claimed 50% polarized light emitting diodes having epitaxial structures comprising active regions sandwiched between n-type and p-type regions for the gas lasers, dye lasers, diode pumped solid state lasers, and LED's (producing "orthogonally polarized green and blue-green beams") of Roddy et al.'s system.

To reject a claim based on the basis of the rationale expressed in section IIIB of the *Examination Guidelines*, Office personnel first must resolve the Graham factual inquiries (as has just been done). Office personnel must then articulate the following:

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- (1) a finding that the prior art contained a device (method, product, etc.) which differed from the claimed device by the substitution of some components (step, element, etc.) with other components;
- (2) a finding that the substituted components and their functions were known in the art;
- (3) a finding that one of ordinary skill in the art could have substituted one known element for another, and the results of the substitution would have been predictable; and
- (4) whatever additional findings based on the *Graham* factual inquiries may be necessary, in view of the facts of the case under consideration, to explain a conclusion of obviousness.

As explained above, Roddy et al. discloses a device (system) which differed from the claimed device by the substitution of some components (50% polarized light emitting diodes, such as the 99% polarized laser diode disclosed by Rudeen at column 5 lines 47-49) for the components (orthogonally-polarized beam generating gas, dye, or solid state lasers, or LED's) found in Roddy et al.'s system. Rudeen discloses that the substituted components and their functions were known in the art. Further, Rudeen discloses that those of skill in the art were familiar with a method of combining a 99% polarized laser diode with a system very similar to Roddy et al.'s system. From the similarities between Rudeen's system and Roddy et al.'s system, one of skill in the art would have been able to conclude that the 99% polarized laser diode could have substituted for the orthogonally-polarized beam generating gas, dye, or solid state lasers, or LED's of Roddy et al.'s system. One of skill in the art would have had reason to predict (based on its functioning in combination with Rudeen's system) that the 99% polarized laser diode would have continued functioning much as it did in combination

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with Rudeen's system, and that when substituted, Roddy et al.'s system would continue functioning in the manner disclosed by Roddy et al. It would therefore have been obvious to a person having skill in the art to modify Roddy et al.'s system by substituting the 99% polarized laser diode taught by Rudeen (and taught, for that matter, by Applicants' reference, Nishiyama et al.) for Roddy et al.'s orthogonally-polarized beam generating gas, dye, or solid state lasers, or LED's.

The Guidelines point out that the both the Graham and KSR decisions require Office personnel to evaluate objective evidence relevant to the issue of obviousness. Such evidence, sometimes referred to as "secondary considerations," may include evidence of commercial success, long-felt but unsolved needs, failure of others, and unexpected results. The evidence may be included in the specification as filed, accompany the application on filing, or be provided in a timely manner at some other point during the prosecution. The weight to be given any objective evidence is decided on a case-by-case basis. The mere fact that an applicant has presented evidence does not mean that the evidence is dispositive of the issue of obviousness.

For evidence of unexpected results one must rely solely on evidence supplied by Applicants. Applicants have actually made the claimed combination. Evidence of differences between results of the actual functioning of the claimed combination and the results of the functioning one of skill in the art would have had reason to predict (i.e., the

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“expected results”) must necessarily come from one who has actually made the combination. A clear case of unexpected results would be if the claimed combination of prior art elements did not in fact perform according to their established functions in a predictable fashion; a result sometimes referred to as “synergy.” See *Anderson’s-Black Rock v. Pavement Co.* 396 U.S. 57, 61 (1969) (note that the *Anderson’s-Black Rock* opinion does not actually employ the word “synergy”). However, the Guidelines make it clear that any type of unexpected results (and indeed any type of secondary considerations) must be considered.

Applicants’ specification, however, does not include any evidence of secondary considerations. Applicants disclose that the claimed combination “may” be made; Applicants do not disclose any unexpected results or indeed any results at all.

Response to Arguments

4. Applicant's arguments with respect to claims 6, 7, 18-21, 23, 32, 33 and 71-74 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L. Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

If attempts to reach the examiner by telephone are unsuccessful, please contact the examiner's supervisor, Sue A. Purvis, at 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**/Thomas L. Dickey/
Primary Examiner
Art Unit 2826**